

**Abstract of the Disclosure**

The present invention relates to spectral analysis systems and methods for determining physical and chemical properties of a sample by measuring the optical characteristics of light emitted from the sample. In one embodiment, a probe head for use with a spectrometer includes an optical blocking element for forcing the optical path between the light source and an optical pick-up optically connected to the spectrometer into the sample. The probe head also includes a reference shutter for selectively blocking light emitted from the sample from reaching the optical pick-up to facilitate calibration of the spectrometer.